Fracture Mechanisms of Unidirectional Fiber Composites

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An analysis of fracture mechanisms of unidirectional carbon-fiber composites and carbon-glass reinforced epoxy by acoustic emission (AE) methods is reported. Characterization of the fracture processes in composites used amplitude distribution and the time-dependent amplitude. Composite materials have been tensile tested on the test machine. The amplitude recorded show dependent fracture mechanisms on carbon-fiber composites and carbon - glass reinforced epoxy. Two different model composites were used at 45 vol % and 50 vol %. AE signals were detected by the PZT -19 transducer, and preamplifier and amplified to 40 dB. AE signals were monitored by the recorder, pulse analyser and connected computer. This analysis shows different spectrum amplitude distributions, for example, in damaged fiber carbon - glass epoxy two pick. The number of activity (events) AE signals on carbon fiber composites was more or less than carbon - glass epoxy, and stress for carbon -glass epoxy was more than for carbon-fiber composites. Also the experiments showed different numbers of AE activity (events) for tensile tests under temperature.